

# Efficiency IDEA BOOK



**GARLAND**  
TEXAS MADE HERE



## LETTER FROM THE MAYOR

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Friends and Neighbors,

In 2012, we published the Residential Idea Book to help Garland citizens improve their homes. It has received statewide and national recognition. This Efficiency Idea Book is the second volume in the Idea Book Series, and is designed to help residents save energy, water and money, all while making homes more comfortable.

Energy efficiency and water conservation are timely topics that will become increasingly relevant in the years to come. Severe drought conditions persist across Texas and highlight the need to use resources wisely. Thankfully, we have a wide range of tools and programs to help us reduce water and energy usage. These are described in the book, along with tips that are specifically for Garland residents.

As you navigate through the Efficiency Idea Book, you'll learn that resource conservation doesn't have to be expensive or complicated. Your family can implement many of the ideas in this book at little to no cost. Best of all, these improvements don't just save energy and water, they'll improve the quality of light and air in your home as well.

My hope is that you'll use this book as an owner's manual for your home and refer to it more than once. Use these pages as an efficiency roadmap and talk with friends and neighbors about your journey. Even better, you can send them this entire book! It's available electronically on the city's website, [GarlandTX.gov](http://GarlandTX.gov), making it easy to email or share online.

Thank you for taking the time to learn how you can make simple changes that will save you money and can have a dramatic impact on our community. I look forward to seeing where this journey brings our city as we continue to grow Garland's future.

Sincerely,

A handwritten signature in black ink, appearing to read 'Douglas Athas', with a long horizontal flourish extending to the right.

Douglas Athas  
Mayor



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# Efficiency **IDEA BOOK**

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The Idea Book Series was made possible by City of Garland Planning and Community Development Department staff, who commissioned CLEAResult to create this book and oversaw the production of this volume as well as the Residential Idea Book that was published in 2012. The following City of Garland departments also contributed to the production of this book: Garland Water Utilities, Garland Power & Light, Building Inspections, and Housing and Community Services.



## TABLE OF CONTENTS



<b>Do-It-Yourself</b> .....	<b>08</b>
Easy Lighting Improvements .....	08
Water Efficiency .....	10
Home Comfort Control .....	12
Energy-Efficient Appliances .....	16
Community Programs .....	21
 <b>The Next Level</b> .....	 <b>22</b>
Advanced Water Efficiency .....	22
Energy-Efficient Landscaping .....	28
 <b>Ultimate Efficiency</b> .....	 <b>32</b>
Home Comfort Control .....	32
Dive Deep for Water Savings .....	40
Last-Step Lighting Improvements .....	43
 <b>Activities</b> .....	 <b>45</b>
Deflection Detection .....	46
Water Leak Hide-and-Seek .....	47
Light Bulb Blitz .....	48
Plug Power .....	50
 <b>Index</b> .....	 <b>52</b>

# DO-IT-YOURSELF

## Introduction

This section contains simple methods for saving resources and money through:

- Easy lighting improvements
- Water efficiency
- Home comfort control
- Energy-efficient appliances
- Community programs

## EASY LIGHTING IMPROVEMENTS



Residential lighting has seen many improvements since the early 1800s, when Edison patented his incandescent light bulb. Still, the U.S. Department of Energy estimates that there are more than 3.5 million incandescent lamps in homes across the country. That's a lot of bulbs, especially considering that only about 10 percent of the electricity consumed by incandescents is converted into usable light. The rest is wasted as heat, which Garland residents have to overcome with air conditioning most of the year. Fortunately, it's easy to replace your conventional incandescents with products that are efficient, affordable and safe.

### *The CFL Sweep*

Saving energy with lighting can be as easy as replacing the screw-in bulbs in your home with compact fluorescent lights (CFLs). When switching to CFLs, keep the following tips in mind:

- ENERGY STAR® bulbs meet the highest standards for brightness, color and energy use.
- Choose a CFL that's the same size as or smaller than your existing incandescent to be sure it fits the fixture.
- For the best compatibility with standard-size screw-in fixtures, look for spiral-shaped, mini sub-compact fluorescent lamps, which are much smaller than conventional CFLs and are available for \$1 - \$4 each.



- Check the CFL package to find the right wattage.
- If you'd like to estimate how much you'll save by switching to CFLs, the City of Garland recommends the Energy Depot Lighting Calculator ([energydepot.com/hometown5/appcalc/pg1.asp?ID=7](http://energydepot.com/hometown5/appcalc/pg1.asp?ID=7)).

### *Sizing Up Your Options*

CFLs are a great way to get started with energy-efficient lighting, but they're not the only show in town. The following table includes more information about CFLs as well as a few other options you might want to consider depending on your preferences and your home.





## Energy-Efficient Lighting Options

Technology	Description	Choose This If You:
<b>Compact Fluorescent Lights (CFLs)</b>	CFLs provide the same amount of light as conventional incandescent bulbs and last up to seven times longer, so you'll save each year through reduced electricity bills and fewer bulb replacements. CFLs cost as little as \$1.74 each, are comparable in light quality to incandescents, and are compatible with most standard screw-in lamp fixtures.	<ul style="list-style-type: none"> <li>• Have a large number of traditional incandescent lights installed in your home.</li> <li>• Are looking for an easy and inexpensive way to start making your home more energy efficient.</li> </ul>
<b>Light-Emitting Diode (LED) Bulbs</b>	LEDs are the most efficient bulbs on the market. They come in a variety of styles and emit less heat than CFLs — but they're also more expensive. However, the cost of LED bulbs has decreased more than 85 percent since 2008. They now sell for about \$10 or less and the price is falling every day.	<ul style="list-style-type: none"> <li>• Want to maximize your energy savings by installing the most efficient bulb in high-use areas of your home.</li> <li>• Are willing to make a small up-front investment in energy efficiency.</li> </ul>
<b>Halogen Bulbs</b>	Halogen bulbs are slightly more efficient than standard incandescent bulbs, but they're not as efficient as CFLs. In situations where light is needed on a precise area or where dimming is a key consideration, halogen lights may be a better choice than CFLs due to their tight-focusing feature and ability to work with almost any switch or dimmer.	<ul style="list-style-type: none"> <li>• Have dimmers or spotlights installed in hallways or other areas of your home.</li> <li>• Want to improve the light output of your reading lamps.</li> <li>• Own art that's illuminated using task lighting fixtures.</li> </ul>

## Did you know?

According to federal law, as of 2014, U.S. lighting manufacturers may only produce screw-in bulbs that use at least 27 percent less energy than conventional incandescent lights. The phase out of conventional incandescent bulbs began in January 2012 with 100-watt bulbs, and in 2014, it was lights out for the 60-watt incandescent, the most popular size.

### Quick Tip: Check for Rebates

Before deciding on a do-it-yourself lighting project, visit manufacturer websites to see if you qualify for rebates.

### Buyer Beware

Watch out for halogen torchiere lamps. These bulbs provide bright light at a low up-front cost, but they consume 300 - 600 watts of electricity and burn dangerously hot, so they're actually quite inefficient and costly in the long run.

### Lighting Terms Explained

- A watt (W) is a measure of energy used to gauge how much power a bulb consumes over time.
- A lumen (lm) is a measure of light used to indicate the brightness of a bulb.
- A kelvin (K) is a measure of temperature used to indicate the shade of white light (or color temperature) that a bulb produces.
- A bulb's efficiency (also called luminous efficacy), is a measure of the light that it emits (lm) divided by the power it draws (W).



## WATER EFFICIENCY



Between 2000 and 2011, Texas experienced five periods in which 100 percent of the state was considered to be in various stages of drought, and in 2011, Texans endured the worst single-year drought in state history. In 2014, as this book is being written, 87 percent of Texas is experiencing water shortages. While water supply is dwindling, demand is growing. In Garland and the surrounding area, the population is expected to grow 96 percent by 2060, while the total water supply declines by about three percent. The good news is that Garland residents can make easy home upgrades that will help reduce excess water consumption, conserve energy and save money.

### *The Flow-Down Lowdown*

A simple way to start saving water is to take a look at the flow rate of your showerheads and faucets. If you have traditional faucets, you can save over half a gallon of water for every minute your faucets run by installing a WaterSense® faucet or aerator. The savings potential for showerheads is even greater. According to the EPA, upgrading to WaterSense showerheads can save a family of four from 10 to 40 gallons of water per day while providing the same visual appearance, water pressure and spray pattern as a traditional showerhead. On top of the water savings you'll achieve, efficient fixtures will also save electricity or gas by reducing the amount of hot water that goes straight down the drain. Here's even more good news: the City of

Garland offers free-energy efficient showerheads and faucet aerators. To find out if you qualify for a free showerhead or aerator, call 972-205-3285.

To determine the efficiency of your faucets and showerheads, look for a gallons-per-minute (GPM) rating. If you find a rating of 2.0 or higher, you could benefit from a WaterSense faucet or aerator. If you can't find a GPM rating, don't worry. Step three of the Water Leak Hide-and-Seek activity on page 47 will help you determine the efficiency of your faucets or showerheads and is a great way for the whole family to learn about water efficiency.

**Feeling the Heat**

You may be wasting energy by keeping your water hotter than necessary. An easy way to assess the temperature setting on your water heater is to turn on the hot water tap for your kitchen sink. Once the water reaches the maximum temperature, can you keep your hand under the stream for 15 seconds? If not, you can reduce your energy bill by up to five percent for every 10 degrees that you lower the thermostat on your water heater. By adjusting the temperature of your hot water tank so that it falls between 118 degrees Fahrenheit and 122 degrees Fahrenheit, you'll save energy, reduce the chance of scalding and keep your water safe for bathing and drinking.

**Wrapping it Up**

Tank wraps – insulated blankets designed to encase your hot water heater – can be purchased at most hardware stores and can improve the efficiency of water heaters that are located in garages, crawl spaces or outside closets. They're quick and easy to install, but as noted in the callout to the right, there are some important safety considerations to keep in mind.

Insulating the first six feet of the hot and cold water lines that extend from your tank is another great way to save energy. Tubular foam is the best type of insulation for this purpose, and should be available at your local hardware store. When selecting and installing pipe insulation, keep these tips in mind:

- Pipe insulation is most effective if your water heater is located in an unheated area such as a garage, crawl space or outside closet.



- Before purchasing insulation, use a tape measure to determine the external diameter of your pipes.
- When selecting insulation, make sure that it's rated R-3 or higher and that the internal diameter of the insulation matches the external diameter of your pipes.
- Be sure to insulate the first six feet of hot water pipe coming off of the water heater, even if it's located inside your home.
- If the water heater is located in an unheated garage or exterior closet, then also insulate the cold water pipes. This will help you save energy on hot water heating and prevent your pipes from freezing on the cold nights that occasionally occur in Garland.

**Did you know?**

The Texas Water Conservation Board (TWCB) estimates that the use of low-flow plumbing fixtures can reduce municipal water demand in Garland by seven percent or more.

**Quick Tip: Match Your Thermostats**

Full-size electric water heater tanks contain two thermostats, each behind an access door. These should both be set to the same temperature to prevent one thermostat from doing more work and potentially burning out too soon.

**Safety Note: Tank Wraps**

If you plan to install a tank wrap, keep these safety tips in mind:

- If your water tank has a warning label that says not to apply exterior insulation, then it's best to listen.
- Forego insulating your water tank if you find that spray foam has been injected between the outer metal skin and the interior tank.
- When installing a tank wrap, make sure that you don't cover the access panels with insulation.
- If you have a gas or propane water heater, be careful not to cover the top of the heater with insulation.

## HOME COMFORT CONTROL



As a Garland resident, you know that sweltering Texas summers can send your air conditioning costs through the roof. This section is designed to help you make easy interior and exterior upgrades that will reduce the amount of energy needed to keep your home comfortable.

### Plugging Air Leaks

Sealing air leaks throughout your house or apartment helps prevent air from leaking into or out of your home, ultimately improving air quality and reducing your heating and cooling costs. Here are two easy tests that will help you identify air leaks in your home.

**Cold-Weather Test** – During the night or in the morning, when the temperature outside is colder than inside, close all doors and windows in your home. Then light a match or a stick of incense and hold it near the perimeter of the door, window or other area that you want to test. If there's an air leak, the smoke will move toward or away from the test area.

**All-Purpose Test** – At any time of the day or night, turn on all exhaust equipment in your home (e.g., dryers, kitchen fans and bathroom fans) and close all doors and windows. Then use a match or a stick of incense to test for drafts in the same manner you would if conducting a cold weather test.

Here are some do-it-yourself methods for plugging common leaks. These may involve purchasing low-cost items, which should be available at your local hardware store.

**Caulk** – Caulk sealing should be used for gaps up to a quarter-inch wide, which are typically found around the perimeter of windows and doors. To seal around windows or doors using caulk, remove the interior trim



**Backer Rods** – If you find that the perimeter of your doors or windows contains gaps between one-quarter of an inch and three-quarters of an inch, you'll want to install a backer rod. These can be used alone or in conjunction with caulk or another sealant.



around the opening and inject the caulk into the cracks. Be sure to avoid using expandable foam, as it may cause difficulty opening or closing your doors or windows and could void your window warranty. After you finish caulking, check to make sure your additions did not change how the openings work and lock.

**Low-Expanding Foam** – Low-expanding foam can be used to discreetly seal gaps larger than three-quarters of an inch. These typically surround plumbing penetrations, such as those you'll find beneath sinks, behind washers and around water tanks. This foam can also be used to seal holes that may lead to crawl spaces, attics, garages or porches.

**Gaskets** – Foam gaskets for outlets and light switches are another way to plug air leaks in your home. These are easy to install and fastening the switch or outlet plate over the gasket is usually enough to keep them in place. To get the maximum benefit from foam gaskets, install them on outlets or switches located on exterior walls at the highest and lowest portions of your home.

**Door Guards** – Door guards, sometimes referred to as sweeps or shoes, are long strips made of plastic, rubber or brush bristles. They can be installed at the bottom of exterior doors to help close any gaps.

## Did you know?

According to ENERGY STAR, air leakage and improperly installed insulation can waste 20 percent or more of the energy used to heat or cool a home.

### Quick Tip: Keep Your Sealing a Secret

When sealing your home with low-expanding foam, look for areas where you can move trim pieces, seal behind them and then replace the trim to cover your sealing materials.

**Weather Stripping** – Weather stripping is used to fill the narrow spaces around the openings of sliding glass windows and doors. Before replacing this material, make sure that your sliding doors or windows close and latch correctly. Online research about your model or type of door can help you get them in good working order and provide you with instructions for removing and replacing the weather stripping. We recommend the kerf seal weather stripping that you'll find at your local home improvement store, but you may like a different type depending on your appearance and durability preferences.

**Chimney Balloon** — A chimney balloon is the easiest way to eliminate fireplace drafts and can typically be installed in less than two minutes. Before ordering a balloon, measure the inside of your fireplace. Then go online to order a correctly-sized balloon via [chimneyballoon.us](http://chimneyballoon.us) or a similar website. To install the device, slightly inflate it so that it takes form, insert it into the fireplace below the damper and inflate it until you achieve a tight fit. Keep the balloon in place until the next time you use your fireplace. So you don't forget that it's installed, make sure the balloon's air intake tube hangs down into the fireplace.

### Breathing Easy

If you're using a dirty air filter, you could be projecting dust and dander into your home, wasting energy and shortening the life of your heating and cooling system. To clean your home's air stream and optimize your heating and cooling system, it's important to select your filters with care and to change them regularly. Selecting an air filter isn't as easy as it may seem. Furnace and air conditioner filters are designed primarily to keep the fan blades, coils and heat exchangers from becoming clogged, blocked or disrupted by debris — not to clean the air in your home. Here's what you need to know when looking for a filter:

- High-efficiency filters are rated using a minimum efficiency reporting value (MERV) system, which scores filters based on how effectively they remove particles smaller than the width of a human hair. Generally, the higher the MERV rating, the better the filter will prevent particles from moving through your heating or cooling system.

**A New Use for Safety Plugs** — Installing child safety plugs in outlets you seldom use can make them safer and reduce drafts.



- Installing high-MERV filters in an existing HVAC system may reduce air flow or increase the energy needed to power fans. This can impact how efficiently the system operates and can reduce the amount of air delivered to rooms that are far away from the HVAC unit.
- To select filters that will improve energy efficiency without reducing air flow, consider one-inch thick filters that are in the MERV 5-10 range. If you want higher efficiency, consider two- to four-inch thick filters. These often create less resistance as they have more and deeper folds in the filter material — but proceed with caution as your system may not be set up to accept two- or four-inch filters unless a contractor makes some changes.
- You might also consider equipping your heating system with electronic filters that work by attracting particles to metal plates.

Once you've selected an air filter, it's important to replace or clean it regularly. If you have electronic filters, they should be cleaned every three to four weeks. One-inch filters should be replaced every three months, and two- or four-inch filters should be replaced every six to nine months.





### Keeping Your Cool

The following measures will help keep your home from absorbing heat from the sun or from other sources, reducing the amount of energy needed for heating, cooling and ventilation.

**Solar Screens** – When it comes to heat-repelling window treatments, solar screens are a popular choice. A good solar screen has a 90 percent shade factor and should have a dark color. It may seem counterintuitive, but the dark color will actually increase your ability to see through the screens. When installing screens, focus on south-facing windows. If you have a lot of west-facing windows and struggle with late-afternoon cooling, then install them on the western side of your house. It's not necessary to install

heat-repelling treatments to north-facing windows, but if you choose to do so for visual impact, remove your screens during the winter to maximize the sun's ability to heat your home.

**Window Film** – Installing window film can reduce the amount of solar heat gained through your windows, which can reduce summer cooling costs. It can also increase the extent to which your windows transmit heat through conductance, helping with winter heating costs. Window films are available through online sources, from window and glass companies, and at your local hardware store. Installation on smaller windows can be completed by most homeowners. Follow the manufacturer's installation manual for the best results.

### Did you know?

Adjusting your thermostat at night and when you're away from home can save you over 10 dollars per year for each degree you turn the thermostat up during the cooling season, and five dollars per year for each degree you turn the thermostat down during the heating season.

#### Conservation Tip: Mind Your Fans

By adjusting your fans so that they're blowing directly on you, you can make your environment feel up to four degrees cooler without cranking up the A/C.

**Landscaping** – One final way to reduce your cooling costs is to surround your home with trees. Deciduous trees like pears and oaks are good choices since they can screen 70 to 90 percent of the hot summer sun, yet still allow breezes through. They also drop their leaves in the winter, allowing the sun to warm your home. Landscaping also offers a variety of additional ways to improve the efficiency of your home. For more information, see page 28.



**Install Power Strips** – To save energy without disconnecting your electronics from a power outlet, plug them into a power strip with a remote on/off switch so that you don't have a clutter of cords in a visible location.

## ENERGY-EFFICIENT APPLIANCES



Reducing the amount of energy that your appliances consume doesn't necessarily mean replacing them. Here are easy ways to save energy or water, whether you plan to keep your current appliances or purchase new ones.

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**Unplug Electronics** – Many devices use energy even when they aren't turned on. To start saving energy, unplug chargers and other devices when not in use. For example, when you detach your cell phone or tablet computer from its charger, unplug the charger too. Be careful what you unplug, though. DVRs, cable boxes and many video game consoles rely on constant power to update, record and communicate with cloud-based servers outside of your home. Unplug one of those devices and you may have an upset spouse or teenager!

**Use a Power Meter** – Plug a power meter between a given appliance and the wall socket to see how much electricity the appliance is using. This will help you find leading sources of energy consumption and

prioritize which products to unplug or replace. A few models to consider are the OWL micro+, the Kill A Watt® P4400 and the Watts up? PRO. For an even more sophisticated, big-picture look at your home's real time electricity use, you might also consider purchasing a power-use monitor. These devices are programmed to read information from your electric meter and relay real time changes in use through an easy-to-read screen. Some models to consider are The Energy Detective (TED) 5000, Blue Line Innovations' Power Cost Monitor and the Cent-a-meter® wireless electricity monitor from Clipsal.

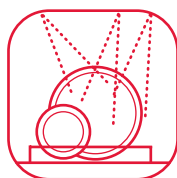
**Tighten Seals and Vents** – Check door seals or gaskets on your refrigerator and freezer by seeing if a dollar bill stays firmly in place when the doors are closed.





If it falls out, consult the manufacturer's website for guidance on installing new seals or gaskets. Also check the outside exhaust vent for your dryer. If you have a conventional exhaust vent, make sure it's clean and that the flapper on the outside hood opens and closes freely. If the flapper stays open, cold air will blow into your house through the dryer and increase heating costs. Better yet, replace the outside dryer vent hood with one that seals tightly.

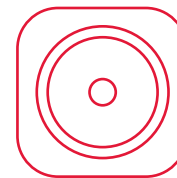
**Adjust Temperature Settings** – For optimum energy savings, set your refrigerator temperature between 36 and 38 degrees Fahrenheit, and the freezer between 0 and 5 degrees Fahrenheit. When washing clothes, use cold water instead of warm or hot (except for greasy stains), and only use cold water for the



Use the no-heat air-dry feature on your dishwasher if it has one. Also look for a built-in heater used to boost water temperature to 140–145 degrees Fahrenheit. If your dishwasher has such a heater, you can save energy by turning your water heater thermostat to 120 degrees Fahrenheit (typically half-way between the medium and low settings).



Many refrigerators have small heaters built into the walls to prevent moisture from condensing on the outer surface. If the option is available, turn this feature off unless you have noticeable condensation.



If your dryer has an auto-dry setting, use it instead of the timer to avoid wasting energy and over drying, which can cause shrinkage, generate static electricity and shorten the life of your clothes.



If you have a front-loading washing machine, use the high-speed spin setting. It will wring more water out of your clothes so that your dryer doesn't have to use as much energy to do its job.

rinse cycle. If you aren't in a rush, let the clothes dry longer on a low-heat setting. This will save energy and is gentler on clothes.

**Consider Location and Content** – If your refrigerator is in the sunlight or next to your stove or dishwasher, move it to a cooler location so it doesn't have to use as much energy to maintain cool temperatures. To save cooling energy, let hot foods cool and cover them before placing them in the refrigerator, label refrigerated items for quick identification and keep your freezer full.

**Build a Stone Tank** – If your toilet was manufactured prior to 1994 and is still in good working order, you can save water by filling a few one-quart plastic bottles with stones and placing them in the toilet tank. This will help displace some of the water used during each flush.

**Use Energy-Saving Features** – Many appliances come with options that most homeowners don't use. See the icons above for common appliance features that can help you save energy.

**Don't Forget to Defrost** – Defrost your refrigerator and freezer on a regular basis since ice buildup means that the compressor has to run longer to maintain cold temperatures, wasting energy. After defrosting, you might be able to adjust the thermostat to a warmer setting, saving even more energy.

**Avoid Hand-Washing** – When used to maximize energy-saving features, modern dishwashers can outperform all but the most frugal hand washers.

**Scrape, Don't Rinse** – Many people pre-rinse dishes before loading them into the dishwasher, even though dishwashers purchased within the last 10 years do a superb job of cleaning even heavily-soiled dishes. If you must rinse dishes first, use cold water.

**Optimize Loads** – Dishwashers use the same amount of water whether they're half-full or completely full, so you'll save a lot of energy if you wait to run your dishwasher. When washing clothes, the best way to save energy is by being careful not to underload or overload your washer or dryer. If you can't air-dry your laundry, save time by drying similar fabrics together, drying multiple loads in quick succession (to take advantage of residual heat) and cleaning the dryer filter after each use.

### **Purchasing New Appliances**

If you're ready to upgrade your appliances, here are some tips to consider.

#### **Refrigerators and Freezers**

- Look for models that use at least 30 percent less electricity than required by federal law.
- Side by side refrigerator-freezer units use more energy than similarly sized models with the freezer on top, even if they both carry the ENERGY STAR label.
- Icemakers and through-the-door ice machines also add to energy consumption. To compare energy performance across different refrigerator types, look for the kWh per year measurement on the yellow EnergyGuide label posted on the refrigerator.



- Refrigerators under 25 cubic feet should meet the needs of most households. Consider purchasing one of these units since models over 25 cubic feet use significantly more energy.
- Resist the temptation to move your old refrigerator to the garage. It's generally much more efficient to operate one big refrigerator instead of two smaller ones.
- Compact refrigerators less than 7.75 cubic feet must be 20 percent more efficient than the minimum federal standard to qualify for the ENERGY STAR label.
- For information about the proper way for Garland residents to dispose of old refrigerators or other appliances, visit [GarlandTx.gov](http://GarlandTx.gov).

#### **Dishwashers**

- About 60 percent of the energy used by a dishwasher goes toward heating the water, so models that use less water also use less energy.
- We recommend that you consider dishwashers that have an estimated energy use of less than 295 kWh per year – about 40 percent better than the federal standard. You can determine whether a dishwasher meets this requirement by checking the yellow EnergyGuide label on each product.
- To find the most water-efficient models, look beyond the ENERGY STAR rating and the EnergyGuide label. Some ENERGY STAR models use half as much water as others, saving

hundreds of gallons of water each year. Check the manufacturer's literature or contact the City of Garland Water Utilities for more information.

- Most dishwashers have several different wash-cycle options. The more options you have, the better you can tailor energy and water use for a particular load. Look at the manufacturer's literature for total water use associated with different cycles.
- Look for dishwashers with an energy-saving no-heat drying feature.

#### *Clothes Washers*

- For the highest-efficiency products, look for the TopTen USA designation at [toptenusa.org](http://toptenusa.org) or the ENERGY STAR Most Efficient label. You should select a washer with the highest modified energy factor and lowest water factor you can find given your budget, capacity needs and other considerations as explained below.
- In general, horizontal-axis (usually front-loading) washers are much more energy- and water-efficient than conventional top-loading washers with agitators.
- All front-loading machines and many high-efficiency top-loaders feature advanced electronic controls to adjust the water level automatically according to the size of the load. If you're considering models that don't have these controls, choose a machine that lets you select lower water levels for smaller loads. In general, you'll save energy by running one large load instead of two medium loads.



- Choose a washer that offers plenty of choices for energy-conserving wash and rinse cycles. Cold wash cycles generally clean clothes perfectly well and are in fact recommended for many fabrics.
- Faster spin speeds can result in better water extraction and thus reduce the energy required for drying.
- City of Garland Water Utilities offers a water conservation credit program that may help you offset the cost of a new energy-efficient clothes washer. For more information, visit [garlandwater.com](http://garlandwater.com).

## *Did you know?*

**An estimated 10 to 15 percent of all electricity used in American homes can be attributed to the buzz of electronic devices. The vast majority is consumed by home entertainment systems and home office equipment. But small energy users, including portable devices with battery chargers, make up a significant share – not because they use a lot of energy individually, but because of their sheer numbers.**

### *Quick Tip: Feel the Power*

The power supplies that increasingly compete for space in our outlets and power strips consume electricity as long as they're connected to a power outlet, whether or not the associated product is on or off, and even if the product is disconnected. You can tell that a wall pack is using energy when it's warm to the touch.

### *Conservation Tip: Don't Forget Your Microwave*

Try to use your microwave whenever possible. Compared to most electric or gas ovens, microwaves use up to 70 percent less energy, cook food up to 75 percent faster and produce much less heat than an electric or gas oven.

### *Clothes Dryers*

- Dryers are not required to display a yellow EnergyGuide label. As of mid-2014, there is no ENERGY STAR program for them, although there is a program in development.
- In terms of energy used, the performance of electric and gas dryers does not vary widely.
- The best dryers have moisture sensors in the drum; others only infer dryness by sensing the temperature of the exhaust air.
- When purchasing a dryer, consider a size that's appropriate for your needs. If you have a family of five with some youngsters, you should consider the large commercial-sized dryers. If you have a household of two, look for a smaller dryer that offers features other than just size.
- Look for a model with a cool-down mode – a feature that will give you an extra bit of drying power without using heat. You should also look for a unit that has a heat-free fluff cycle for removing creases and wrinkles.

### *Home Entertainment and Office Equipment*

- Look for the ENERGY STAR label when purchasing a new TV, DVD player, VCR, audio system or digital-to-analog converter box. The ENERGY STAR label ensures low standby power use for these appliances – in most cases only one watt or less. To identify the most efficient products along with prices and where to buy locally, see the TopTen USA listings at [toptenusa.org](http://toptenusa.org).

- Look for the ENERGY STAR label on new PCs, printers, faxes and copiers. To find the most efficient models and a directory of local retail outlets where you can purchase products, see the TopTen USA listing referenced previously. Remember, you must enable the power management features on your computer and monitor in order to save energy.
- ENERGY STAR qualified power supplies are now available and are being sold with a growing number of electronics products. For more information, visit [efficientpowersupplies.org](http://efficientpowersupplies.org).

### *Stoves*

- If you're in the market for a new stove, consider a model that uses induction heating. Induction stoves require a significant up-front investment, but they're an extremely efficient option and can pay for themselves over time if you do a lot of cooking.

### *Toilets*

- Before shopping for a new toilet (especially if your new unit will be located in an area where a toilet was not installed previously), consider the:
  - Size of the space in which you plan to install the toilet.
  - Shape and style of the unit that you'd like to purchase.
  - Condition of the flooring, subflooring and walls that surround the tank; you want to make sure that these surfaces won't be damaged if your toilet leaks or if

condensation collects on the tank exterior.

- Cost required to prepare for and complete the installation process.
- If you decide to purchase a new toilet, look for a WaterSense-rated power-flush or dual-flush unit.
- City of Garland Water Utilities offers a water conservation credit program that may help you offset the cost of a new energy-efficient toilet. For more information, visit [Garlandwater.com](http://Garlandwater.com).





## COMMUNITY PROGRAMS



The city of Garland sponsors a number of programs that can help you save water and energy. If you're interested in easy ways to save, one of the best events to attend is Garland's annual Healthy Living Expo, which is designed to help residents conserve water, save energy and create a sustainable community.

To find out when this year's expo is scheduled to happen, visit [GarlandTx.gov](http://GarlandTx.gov). Then grab a neighbor and head on down for free water- and energy-saving giveaways and more information about local programs that can help you identify quick and easy ways to save resources and reduce your utility bills.

This section includes data from the following organizations:

- U.S. Department of Energy
- National Drought Mitigation Center
- National Public Radio
- Texas Water Development Board
- CLEAResult

For further reading, see:

- The History of the Light Bulb, [energy.gov/articles/history-light-bulb](http://energy.gov/articles/history-light-bulb)
- Dried Out: Confronting the Texas Drought, [stateimpact.npr.org/texas/drought/](http://stateimpact.npr.org/texas/drought/)
- Water for Texas: 2012 State Water Plan, [twdb.texas.gov/publications/state\\_water\\_plan/2012/02.pdf](http://twdb.texas.gov/publications/state_water_plan/2012/02.pdf)
- Energy Conservation Tips, [gpltexas.org/utilconstips.html](http://gpltexas.org/utilconstips.html)

## A Note From Your Neighbor

**“I’ve been a Healthy Living Expo volunteer for five years and during that time I’ve seen the community’s growing interest in sustainability. It’s been very rewarding to provide expo attendees – many of whom return year after year – with free energy-efficient items for their homes as well as information about local conservation programs and ways in which the city can help them save water and energy.”**

– Nancy Murrell, Garland Resident

# THE NEXT LEVEL

## Introduction

When it comes to energy-efficient upgrades for your home, do-it-yourself improvements are just the beginning. In this section, we'll describe more advanced ways to save energy and conserve resources, either by yourself or with the help of a contractor. This section covers:

- Advanced water efficiency
- Home comfort control
- Energy-efficient landscaping

## ADVANCED WATER EFFICIENCY



As this book is being written, city officials have placed Garland under stage-three water restrictions, underscoring the need for residents to conserve water – an action that's vital even when it's not mandated since, by 2060, conservation and reclaimed water use are expected to generate 23 percent of the dwindling water supply in Garland and the surrounding areas. If you adhere to citywide water restrictions and implement the do-it-yourself measures on pages 8 - 21, you're certainly helping to mitigate water shortages, but there's still more that you can do. This section will help you take your conservation efforts a step further.

### Smart Sprinkling

Follow these tips to make sure you're only using what's necessary when you water grass, plants, trees or other foliage that surrounds your home:

- Learn how much water evaporates through your plants. A plant's evapotranspiration (ET) rate – the amount of water that's evaporated from the soil and transpired through the plant's leaves – will tell you how much water you need to replace through irrigation or watering. The ET rate for Garland plants can be identified daily at [texaset.tamu.edu](http://texaset.tamu.edu).
- Water your plants in the early morning when evaporation rates are low.
- If you've installed a sprinkler system, look



for dark green spots in your lawn. These can indicate a leak, that your sprinklers are spraying against the house or that there's another flaw in your system.

- When mowing your lawn, take care not to damage sprinkler heads as this can cause them to use more water than necessary.

### Xeriscaping

Xeriscaping is a systematic method of promoting water conservation in landscaped areas by focusing on native plants that use less water. For a list of native plants, connect with the Garland chapter of the Native Plant Society of Texas at [npsot.org/wp/](http://npsot.org/wp/)



garland, or try the Lady Bird Johnson searchable database at [wildflower.org/plants](http://wildflower.org/plants). Xeriscaping is mostly used in extremely arid regions but it can be applied anywhere, including Garland. Here are some basic xeriscaping principles to keep in mind when landscaping your home.

**Take time to plan and design** – This critical step helps you map your water and energy conservation strategies to the landscaping projects that you plan to undertake.

**Pay attention to selection and placement** – Choose plants that will flourish in your regional climate, plant them in locations where they will receive the right

amount of sunlight and always group plants with similar water needs.

**Limit turf areas** – Try not to use bluegrass turf, which usually requires a lot of supplemental watering.

**Improve the soil** – Use the right soil for the plants you've selected, aerate the soil and don't forget to fertilize. This will enable better water absorption and will encourage plants to grow deeper roots.

**Water efficiently** – Choose an irrigation method that delivers water as economically as possible. Drip systems are more efficient for xeriscaping and plant life; sprinkler systems will provide the most benefit when used properly.

**Use mulches** – These keep plant roots cool, minimize evaporation, prevent soil from crusting and reduce weed growth.

**Maintain the landscape** – Keep plants healthy by weeding, pruning, fertilizing and controlling pests.

When xeriscaping, take care to make sure that your front lawn remains consistent with others in your neighborhood. For more curb appeal do's and don'ts, see the first book in this series, which is available online at [GarlandTx.gov](http://GarlandTx.gov). For additional information about xeriscaping, visit [gardenguides.com](http://gardenguides.com) or [doityourself.com](http://doityourself.com).





**Kid-Friendly Conservation** – To help your kids learn more about water conservation, sit down with them and play the EPA's WaterSense game (you can access the game by navigating to [epa.gov/watersense/kids/games.html](http://epa.gov/watersense/kids/games.html)). You'll all have fun while learning more about your family's water-savings potential!



**Dealing with Drought** – For more information about how to safeguard your landscaping during severe drought restrictions, check out these articles at [GarlandTx.gov](http://GarlandTx.gov): Landscape Survival Guide, Protecting Trees During Drought and Cycle and Soak Irrigation Method.



### Getting a Handle on Your Toilets

The average household contains at least one toilet that's leaking water (or just using it inefficiently). Here are a few tips you can use to make your toilets more efficient without sacrificing performance:

**Identify leaks** – In order to determine if water is leaking from the toilet tank into the bowl, put five drops of blue or red food coloring into the tank. Without flushing, do you see any red or blue in the bowl? If so, you have a leak and should contact a plumber to fix it.

**Replace the flush gasket** – Old gaskets may be leaking and need to be replaced. Flush gaskets usually come in kits that include the chain and flush handle and are available at your local home improvement store.

**Consider your GPM rating** – Check out the top of your toilet bowl, just behind the seat. Here you'll often find the gallons-per-minute (GPM) rating of your toilet. The most efficient devices have a GPM rating between 3.4 and 1.6. If your toilets don't fall in this range, you might consider upgrading to a low-GPM unit with a WaterSense label and the following features:

- Dual-flush functionality that allows for either a half flush or a full flush.

- Powered flushes (but be aware that these may make more noise than you're used to hearing). Powered-flush toilets use compressed air for a better flush at a low flow rate and may be more reliable than a dual-flush toilet.





## HOME COMFORT CONTROL



Air conditioning and space heating typically account for 40 percent of Texans' energy costs, so energy-efficient home climate control can have a big impact. Here are some advanced measures you can take to keep your home comfortable without sending your energy bills through the roof.

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### *Set It and Forget It*

Programmable thermostats will automatically adjust your home to the most comfortable and efficient temperature. Here are some things to note when selecting one:

- Nearly any programmable thermostat on the market will suggest optimal temperature settings for your location and schedule so you don't have to manually adjust the temperature. Some models offer more advanced features like remote control via your smart phone.
- In most cases, programmable thermostats will improve the comfort of your home since they typically maintain a temperature within one or two degrees of the set point. Traditional

thermostats often vary from the set point by up to three degrees or more.

### *Strip Heat Lockouts*

If your home is equipped with a heat pump, you can save a significant amount of energy by installing a strip heat lockout accessory. This device can be installed by any HVAC contractor and can save energy by ensuring that your heater only uses the energy-intensive strip heat feature when outdoor temperatures are less than 35 degrees Fahrenheit.

**Window A/Cs**

Window A/C units require more energy than central air conditioners, but if you use them strategically to cool only the spaces where you spend the most time, they can lower the overall amount of energy needed to cool your home. Here are some things to consider when selecting or installing a window A/C unit:

- It's important to consider room height, local climate, shading and window size. Also, make sure you have a suitable power supply. Smaller window air conditioners can be plugged into any 15- or 20-amp, 115-volt household circuit that's not shared with another major appliance. Larger window air conditioners need their own dedicated 115-volt circuit and the largest

models require a dedicated 230-volt circuit.

- It's important to choose an A/C unit that's rated correctly for your room. Choose a unit that's too large and it will cool unevenly and can even leave the room feeling damp or clammy. Generally, a window A/C unit requires 20 to 30 British thermal units (Btus) of energy for each square foot of living space it needs to cool. For example, a 250-square-foot bedroom would need a unit rated for 5,000 to 7,500 Btus.
- Air conditioner efficiency is measured using an energy efficiency ratio (EER). The higher the EER, the more efficient the air conditioner. When buying a new room A/C, look for

ENERGY STAR® units with an EER of 10 or more.

- You may be able to save on an ENERGY STAR air conditioner by taking advantage of incentive programs from Garland Power & Light. To learn more, visit [gpltexas.org/energysaver.html](http://gpltexas.org/energysaver.html). If you plan to mount your A/C near the corner of a room, look for a unit that can direct airflow in the desired direction for your room layout. If you need to mount the air conditioner at the narrow end of a long room, then look for a thrust feature that sends cooled air further into the room.



### Exhaust Fans

You can save energy and improve air quality in your home by:

- Installing new exhaust fans so that they're located as close to moisture or pollutant sources as possible.
- Equipping your kitchen range hood with an exhaust system that connects to the exterior of your home. This will provide better air quality than a kitchen recirculation fan.

### Recessed Lighting Retrofits

Retrofitting your recessed lighting fixtures with LED lights and a tighter trim ring can prevent heated air from leaking out of your living space and into the attic through the space between your lighting fixture and the interior drywall surface. Many manufacturers sell recessed- or can-lighting retrofit kits. Purchase one of these and you should be able to complete this upgrade without using special tools.

## Did you know?

The average room air conditioner energy efficiency ratio (EER) rose 47 percent between 1972 and 1991, so if you own a vintage window A/C unit from the 1970s and you replace it with a newer model, you're likely to cut your air conditioning energy costs in half.

### Quick Tip: Clean Cooking

Cooking – a major contributor to poor indoor air quality – can impact your health if it's not conducted in a well-ventilated kitchen. Here are a few easy ways for you to prevent your dinner from polluting your home:

- Don't forget to turn your range hood to the highest tolerable level every time you cook.
- If your range hood doesn't extend over the front burners of your stove, cook on the back burners. This will enable the hood to remove air pollutants up to twice as effectively.
- If a range hood isn't available or if your range hood doesn't vent to the outdoors, open a window while you cook.



## ENERGY-EFFICIENT LANDSCAPING



**You can achieve heating and cooling cost reductions when you carefully plan the landscape around your home.**

**This section contains landscaping strategies that require a small investment of time or money, but can yield significant savings.**

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### *Landscaping that Pays Year-Round*

If you're smart about the yard work you do in the spring and summer months, you can set the foundation for an outdoor landscape that saves energy even in mid-winter, when your gardening tools are tucked away.

#### *To reduce winter energy costs:*

- Create open lawn areas on the south side of your home. The light reflected off of the rare Garland snow that may accumulate in these areas can offer a radiant heating effect.
- Build a tall fence to slow winter winds, lower your heating bills and provide protection for plants that are sensitive to cold weather. The most effective fences are semi-open structures

that allow air to move through them.

- Trees can also be used to shield your home from wind. When using trees as windbreaks, plant them on the north and northwest sides of your house and concentrate more on depth than height. A good strategy is to plant a row of low-growing flowering trees and shrubs closest to your home. Follow those with a second row of taller deciduous trees and a third row of tall evergreens.
- Surround your home with stone or concrete surfaces, such as patios. These will soak up heat during the day and reflect it during cool evenings.



*For summer energy savings:*

- Build a pergola, ramada, awning or other shade-giving structure on the west side of your house to filter light during the hottest part of the day. An open structure, such as a vine-covered pergola, is ideal as it allows cool breezes through and doesn't trap heat.
- Position porches, decks and patios on the east side of your home. They'll become an ideal gathering spot because of their early-morning warmth and they won't be sauna-like during the afternoon heat. A shade tree will keep the area even cooler – minimizing the need for electricity when using this space.
- When selecting ground covers, choose dark stone or wood chips. These options will absorb heat whereas light-colored stone, granite mulch or concrete will reflect heat, making things hotter.
- Place trees where they'll shield your windows from direct sun, especially the windows on the south and west sides of your home. Deciduous trees are a great option since they feature leaves that block sun during hot weather.
- Plant a row of trees on one side of your house and a wall on the other side to funnel breezes through the property and around your home. You can also plant a cluster of trees to create cool breezes that will be distributed throughout your property and around your home.
- Using a trellis, surround or even cover a few of your windows with a deciduous vine such as a sweet autumn clematis, morning glory or scarlet runner bean. The vine leaves will create filtered shade during the summer.





### ***Here Comes the Sun***

Solar-powered lights can be a great addition to your outdoor landscape. These lights use solar cells and batteries to convert sunlight into electricity; then they store that electricity for use at night and during cloudy days. They're virtually maintenance free, and best of all, they won't increase your electricity bill. Here are some things to keep in mind when selecting solar-powered outdoor lights:

- Popular home uses for outdoor solar lighting include pathway light sets, wall-mounted lamps, freestanding lamp posts and security lights.
- Lights can vary in size from small, glowing pathway markers to pole-mounted patio units and high beam security lights.
- It's important to consider geographic and site-specific variables when choosing a solar-powered lighting product.
- Some solar lighting systems are self-contained units, so you only need to place the lights in a sunny location. Others include lights that are separate from the solar cell panel, in which case only the panel needs to be placed in a sunny location.
- A solar lighting system will work well as long as its solar cells are exposed to sunlight for the amount of time the manufacturer recommends. If the cells are located in an area where they won't receive the recommended amount of sunlight, performance and battery life will be impacted.
- To maximize sunlight exposure, make sure solar cells are free from bird droppings and aren't shaded by landscape features such as trees and buildings.
- Nightly operating times can vary based on how clear the sky is on a given day. In the winter months, operating time may vary by as much as 30 to 50 percent unless the solar lighting system has been designed specifically for winter operation.
- Before you buy an outdoor solar lighting system, check with the manufacturer to see if replacement bulbs or batteries are available. Some units do not provide replacement options.

### Save in the Shade

For extra motivation to roll up your sleeves and install a few shade trees, consider these facts:

- Well positioned trees can reduce your heating and cooling costs by up to 25 percent.
- A tree-shaded yard can be up to 6 degrees cooler than a sunny yard and a shaded lawn can be up to 25 degrees cooler than sunny pavement.
- Shading your roof can increase the efficiency of your air conditioner by more than 10 percent.
- A single shade tree can reduce your cooling bill by as much as 50 percent.



### Did you know?

**If you landscape carefully, it's possible to reduce your energy consumption by 25 percent.**

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This section includes data from the following organizations:

- Texas Water Development Board
- U.S. Energy Information Administration
- Association of Home Appliance Manufacturers
- Lawrence Berkeley National Laboratory
- U.S. Department of Energy
- U.S. Environmental Protection Agency
- Better Homes and Gardens

For further reading, see:

- *Pollution in the Home*, [newscenter.lbl.gov/feature-stories/2013/07/23/kitchens-can-produce-hazardous-levels-of-indoor-pollutants/](http://newscenter.lbl.gov/feature-stories/2013/07/23/kitchens-can-produce-hazardous-levels-of-indoor-pollutants/)
- *Landscaping for Energy-Efficient Homes*, [energy.gov/energysaver/articles/landscaping-energy-efficient-homes](http://energy.gov/energysaver/articles/landscaping-energy-efficient-homes)

# ULTIMATE EFFICIENCY

## Introduction

This section will help you make informed decisions about upgrades that require the assistance of a contractor and can involve an up-front investment, but will have a big payback in terms of energy and cost savings. It's organized into three parts:

- Home comfort control
- Dive deep for water savings
- Last-step lighting improvements

## HOME COMFORT CONTROL



In the previous section, we discussed intermediate measures that can help you control the cost of heating and cooling. Here, we'll go into more detail about advanced steps you and a contractor can take to efficiently regulate temperature and air quality, save money and make your home more comfortable.

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### ***Be a Duct Detective***

Leaks in your duct system – which occur when duct connections are not correctly sealed, when ducts are damaged or when they contain ancillary materials like plumbing, wire or cable – can cause heated or conditioned air to leak into areas like attics, garages or crawl spaces and can decrease the overall cooling efficiency of your home by up to 15 percent during a hot Garland summer.

The best way to expose any leaky ducts that are hiding in your system is to hire a contractor who can:

- Perform a duct leakage test.
- Fortify your ducts using best practices such as:
  - Sealing system connections like joints,

seams, spins and take-offs.

- Starting at the air handler and working outward.
- Plugging holes with duct-sealing mastic.
- Making sure that all connections are mechanically sealed.

Using measures such as these, a good contractor should be able to reduce your duct leakage rate by at least 30 percent. For more information about duct sealing incentives, visit [gpltexas.org/energysaver](http://gpltexas.org/energysaver).





### ***Get Your Ducts in a Blanket***

If your ducts aren't properly insulated, the heated or conditioned air blowing from your vents won't be as warm or as cool as it should be. This problem can be addressed by adjusting the thermostat, but if your ducts aren't properly insulated, thermostat adjustments will often just shift the problem to a different room in your home. On top of that, this solution will cause your HVAC system to work harder than necessary, wasting energy, shortening the life of the system and possibly leading to condensation on your ducts, which can cause water to drip into your insulation, onto your drywall or even into your home.

To keep your home comfortable without overtaxing your HVAC system, work with a contractor to make sure all air conditioning or heating ducts are located in attics, garages or crawl spaces, and that duct insulation:

- Has a rating of R-8 (about the same as 2.5 inches of fiberglass).
- Fully covers the ducts and is fastened in a permanent manner that does not compress the insulation.
- Is not also serving as attic or floor insulation.

### ***Did you know?***

**Duct tape is great for many things – except duct work! Make sure that contractors plug your ducts with duct-sealing mastic instead of painting the mastic on the ducts, or worse, sealing your ducts with tape.**

### ***During Garland Summers, Ducts Sweat Too***

On a hot and humid Garland day, your duct work is like a cold glass of iced tea sitting on the porch table. We all know what happens to the outside of that glass – it sweats. More accurately, it condenses moisture out of the humid air. If your cooling ducts aren't properly insulated, the same thing can happen to the duct system in your attic, which can cause water to drip into your insulation, onto your drywall or even into your home.

### Insulate Yourself

After you've air sealed your home by shoring up your ductwork and taking the measures described in the Home Comfort Control section on page 12, you're ready to work with a contractor to assess the insulation in your home and/or install new insulation. See the table to the right for insulation tips that you can use to guide a discussion with your contractor.

If you're concerned about the environmental impact of your insulation, note that:

- Almost all batt insulation contains recycled content.
- All major brands of fiberglass insulation have either gone entirely formaldehyde free or offer formaldehyde-free products. These products work just as well as those with formaldehyde. We recommend that you choose formaldehyde-free insulation if you're concerned about indoor air quality or if a member of your family has a compromised immune system.
- Be aware that formaldehyde-free insulation will not necessarily be odor free. Many insulations will emit an odor when they're first installed. These odors are harmless and will dissipate in a few days to a few weeks.

### Overview: Home Insulation

Area of Your Home	Why Assess This Area	Recommended Insulation		Other Considerations
		Type	Rating	
Attic	During summer months, heat from the sun can transfer from your roof into your home, increasing your cooling costs. The rest of the year, an uninsulated roof can enable heat to escape from your home, increasing your heating costs.	Loose-Fill Fiberglass or Fiberglass Batt	R-30 to R-49	<ul style="list-style-type: none"> <li>• For existing homes that have been air sealed, it's not necessary to insulate attics with batts that are faced with paper or foil vapor barriers.</li> <li>• To achieve R-30 with batt insulation, you could purchase R-30 batts or use two layers of R-15 batts, placing the first layer in-between the ceiling joists and the second layer across the top. The latter method allows for better coverage over the ceiling joists.</li> <li>• Loose-fill cellulose can be a nice alternative to loose-fill fiberglass or fiberglass batt.</li> </ul>
Floor	Almost one-third of the average home's surface area is made up of floors. If these are cold, you'll be uncomfortable when you walk on them and will be more likely to turn up the heat, so preventing floor temperature fluctuation is a surefire way to both save energy and increase comfort.	Fiberglass Batt	See the Other Considerations column	<ul style="list-style-type: none"> <li>• For floor insulation, R-values should be determined based on the dimensions of the space between floor joists. For example, if the floor joists are 16 inches on center and the floor joists are six inches deep/tall, then use R-21 insulation that fills the entire cavity.</li> <li>• Floor insulation should be in full contact with the underfloor and should not be pinched, squished or have gaps around it.</li> </ul>
Walls	Properly-insulated walls resist heat loss or gain, saving energy and improving comfort by keeping your family warm or cool (depending on the season) and enabling your heating and cooling system to operate as effectively as possible.	Blown-in Fiberglass or Cellulose	R-11 to R-23	<ul style="list-style-type: none"> <li>• Do NOT attempt to install wall insulation without the help of a contractor. Besides the potential to damage the walls, siding and surrounding plant life, there are also a myriad of other things that can go wrong, especially if your home was built in 1970 or earlier, since homes that were built during this period are likely to contain lead paint or asbestos.</li> <li>• When insulating walls, contractors should fill them completely so that the insulation is as thick as your wall framing.</li> </ul>



### ***Plugging Your Chimney***

In today's world, chimneys are used every once in a while. The rest of time, they're just holes that constantly draft, or allow heated or conditioned air to escape to the exterior of your home. To eliminate drafting when your fireplace isn't in use:

- Check to see if your fireplace damper opens and closes. If it doesn't close or if you can see daylight around it after it's closed, get in touch with a contractor who can adjust the damper so that it completely seals your chimney. If you have a gas fireplace, note that your dampers should stay partially open to help remove gas fumes and pilot light exhaust.

- Make sure bad weather didn't carry your chimney cap away. If you find your chimney without a cap, call a contractor immediately since capless chimneys can allow birds, animals and insects into your home. They can also allow rain and snow to be absorbed into your chimney's inner flue tile, outer bricks and mortar. Once this happens, freeze/thaw cycles can compromise the integrity of your chimney.

### ***Through the Window***

Windows are wonderful for style, curb appeal and lighting, but they can also cause your home to gain heat during long Garland summers or lose it during

cooler months. The good news is that you can work with a contractor to optimize your existing windows using the following tips:

- Prevent drafts by lining the inside of your window frames with clear, heavy-duty plastic sheeting that's 0.7 to 4 millimeters thick.
- Mount tight-fitting, insulating shades on windows that have been weatherized but still feel drafty.
- Install exterior or interior storm windows, which can reduce heat loss by 25 to 50 percent. Storm windows should have weather stripping at all movable joints, be made of durable materials and have joints that interlock or overlap.

## Overview: Heating and A/C System Tune-Ups

System Type	Tune-Up Frequency	Benefit	Other Considerations
<b>Gas furnace</b>	Annually for systems over 10 years old and every three years for newer systems.	Increased burning efficiency and combustion component longevity.	<ul style="list-style-type: none"> <li>Furnace blowers should be cleaned if dirty.</li> </ul>
<b>Electric furnace</b>	Every three or four years.	Proper operation of the electrical components, including electric heat elements, sequencers and relays.	<ul style="list-style-type: none"> <li>Furnace blowers should be cleaned if dirty.</li> </ul>
<b>Heat pump</b>	Every two years for systems over 10 years old and every three or four years for newer systems.	Increased system longevity, home comfort and system performance.	<ul style="list-style-type: none"> <li>Increased system longevity, home comfort and system performance.</li> </ul>
<b>Air conditioner</b>	Every two years for systems over 10 years old and every three or four years for newer systems.	More efficient and effective cooling, extended system life, reduced energy costs, improved humidity control and a more comfortable home.	<ul style="list-style-type: none"> <li>Contractors who perform air conditioner tune-ups should: <ul style="list-style-type: none"> <li>Verify the air conditioner's refrigerant charge using a digital refrigerant analyzer.</li> <li>Adjust the refrigerant to the manufacturer's specifications.</li> <li>Test the air conditioner to verify cooling capacity.</li> </ul> </li> <li>To find a licensed air conditioner contractor, visit <a href="http://tdlr.texas.gov/licensesearch">tdlr.texas.gov/licensesearch</a>.</li> </ul>

- Repair and weatherize your current storm windows, if necessary.
- Close curtains on south- and west-facing windows during the day.
- Install awnings on south- and west-facing windows.
- Place sun-control screens or reflective films on south-facing windows to reduce solar heat gain.

It's always preferable to make the most of what you have, but you may want to consider replacing your windows altogether if they're:

- Made up of a single pane (only one piece of glass).
- Double-pane windows with aluminum frames.

- Double-pane windows with a bad gasket (this is usually the case if your windows fog between the panes).

If you're considering replacing your windows, here are some things to keep in mind when discussing the project with your contractor:

- In general, the most energy efficient windows are those that are framed with wood, vinyl or fiberglass.
- If you like the look of dark metal or brushed aluminum, you can purchase wood- and fiberglass-framed windows that are covered with aluminum (though these are a bit more expensive than other options).
- Look for windows that are ENERGY STAR rated.

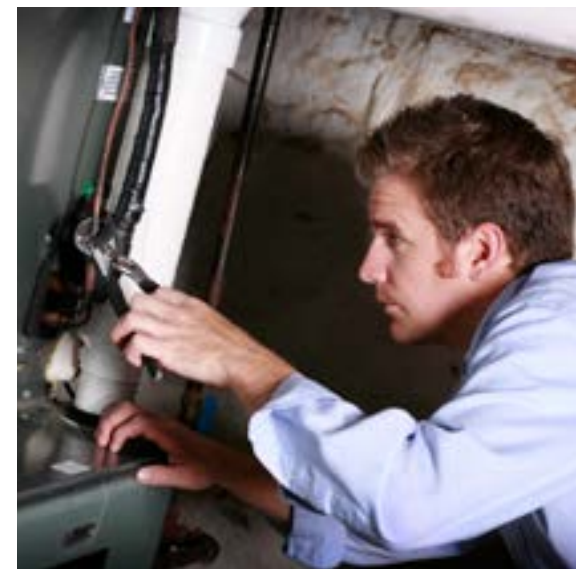
- Make sure you purchase windows with a U-value of 0.35 or less and a Solar Heat Gain Coefficient (SHGC) of 0.30 or less.

### A New Lease on Heating and Cooling

When your home is thoroughly air sealed and insulated, you can increase the efficiency of your heating and cooling systems with confidence, knowing that your efforts will reduce your energy bills and that you won't be paying to heat or cool air that escapes from your home through cracks or uninsulated areas. See the table above for a list of things you should keep in mind when working with a contractor to tune-up your heating or air conditioning system.

## Qualities of Efficient Heating Systems

Overall Efficiency of the Heating System	AFUE	Equipment Characteristics
High	90 – 98.5 percent	<ul style="list-style-type: none"> <li>• Flue gases are condensed in a second heat exchanger for extra efficiency.</li> <li>• Combustion processes are sealed.</li> </ul>
Medium	80 – 83 percent	<ul style="list-style-type: none"> <li>• Exhaust fan controls the flow of combustion air and combustion gases more precisely.</li> <li>• Electronic ignition (no pilot light).</li> <li>• Compact size and lighter weight to reduce cycling losses.</li> <li>• Small-diameter flue pipe.</li> </ul>
Low	50 – 70 percent	<ul style="list-style-type: none"> <li>• A natural draft that creates a flow of combustion gases.</li> <li>• Continuous pilot light.</li> <li>• Heavy heat exchanger.</li> </ul>

**Pump Up the Heat**

If your heating system is more than 25 years old; if tune-ups don't seem to improve performance or if your system can't be tuned-up, consider working with a contractor to replace it with a high-efficiency heating system. When combined with energy efficiency upgrades like the ones described in this book, these systems can reduce your fuel bills and your furnace's pollution output by 50 percent. Here are some tips you can use when working with a contractor to select and install a new energy-efficient heating system:

- Before installing a new heating system, make every effort to improve air sealing and insulation throughout your home to ensure that heated air is not leaking through cracks or uninsulated areas.
- Consider local energy costs, fuel type and the number of months that you heat your home each year.
- Have a heating contractor determine the most appropriate system size by evaluating heat loss/gain in every room of your home. Don't let him or her simply propose a system of the same size as your old one, since if your existing unit is old, there's a good chance it was oversized.
- Though high-efficiency units typically cost more than less efficient models, you may save if your contractor determines that you need a smaller unit compared to your old one. And remember - any cost difference will be

paid back over time through lower energy bills. For more information about heat pump incentives from Garland Power & Light, visit [gpltexas.org/energysaver](http://gpltexas.org/energysaver).

- Don't forget to compare the warranties for each furnace you're considering.
- Remember that the City of Garland requires permits for system replacements. You can find information on residential and construction building permits at [GarlandTx.gov](http://GarlandTx.gov).
- Assess the efficiency of electric, gas or propane heating systems by considering the Annual Fuel Utilization Efficiency (AFUE) or equipment characteristics of each unit using the table above.



- If you plan to purchase an **electric heater**, we recommend that you consider a high-efficiency heat pump system instead since these systems use up to 75 percent less electricity than standard electric heaters. They're also better at reducing humidity in your home, resulting in less energy usage and more comfort during summer months.
- If you plan to purchase a **gas or propane heater**, choose a sealed-combustion furnace. This type of heater will bring outside air directly into the burner and exhaust flue gases to the exterior of your home without the need for a draft hood or damper.
- If you plan to purchase a **heat pump**:
  - Look for the ENERGY STAR label.
  - Select a unit with a SEER rating of 15 or better, an EER of 12 or better, an HSPF rating of 8 or better and an outdoor sound rating of 76 decibels or less.
  - Make sure your new unit is equipped with a demand-defrost control. This will minimize the defrost cycles, thereby reducing energy use, as well as noise from fans and compressors.
  - To further minimize noise disruptions, ask your contractor to locate the outdoor unit away from windows and adjacent buildings. You can also ask the contractor to mount the unit on a noise-absorbing base.

- Ductless mini-split heat pumps make good retrofit add-ons to houses with non-ducted heating systems, such as hot-water heat, radiant panels, electric baseboard and space heaters. They can also be a good choice for room additions where extending or installing distribution ductwork is not feasible.

### **Helping Your Home Breathe**

In a well-insulated and air-sealed home, heating, ventilation and air conditioning systems should be assessed and optimized to ensure that your home breathes enough to provide reasonable indoor air quality and to prevent building degradation due to moisture build-up. It may be odd to think of your home as having a breath, but houses and apartments do breathe on their own when outdoor temperatures change, when the wind blows, when fans come on and even when you use your central heating and cooling systems. Garland Power & Light's free energy audit program is a great way to identify opportunities to improve the breath of your home. To learn more about how you can request a free energy audit, visit [gpltxas.org/utlaudits.html](http://gpltxas.org/utlaudits.html) or call 972-205-2671.

Whether you're working with Garland Power & Light's energy audit staff or an independent contractor, here are some tips you can use to help your home breathe as efficiently and effectively as possible:

- Make sure space heating and cooling registers are located as far as practical from exhaust vents to minimize the amount of conditioned air that's exhausted with the polluted air.



- Use spot ventilation fans in your bathroom and kitchen since these areas are where the most moisture and odors are created. Spot ventilation fans can be noisy, but several manufacturers offer models that minimize this problem.
- To reduce moisture build-up in your bathroom, wire the room so that the fan runs whenever the light is on.
- Never attempt to add ventilation to your home without the help of a trained professional since, in rare cases, ventilation additions can cause combustion safety and carbon monoxide issues.



### **Insulation and Heating Terms Explained**

**Batt** is short for batting — a blanket of thermal insulation, such as fiberglass.

An **R-value** is a measure of resistance to the flow of heat through insulation. Higher R-values indicate better insulating properties.

The **Heating Seasonal Performance Factor** (HSPF) measures the efficiency of a heat pump compressor and electric-resistance elements. The most efficient heat pumps have an HSPF between 8 and 10.

The **Energy Efficiency Ratio** (EER) is a measurement of the efficiency of a cooling system when the outdoor temperature is at specific levels. Efficient systems have an EER of 12 or higher.

The **Seasonal Energy Efficiency Ratio** (SEER) rates a heat pump's cooling efficiency and is essentially the seasonal average of the EER. The most efficient heat pumps and air conditioners have a SEER between 14 and 21. Both EER and SEER are valuable ways to compare air conditioners.

**Annual Fuel Utilization Efficiency** (AFUE) is the ratio of the heat that a furnace or boiler produces annually compared to the total annual fossil fuel energy that it consumes. An AFUE of 90 percent means that 90 percent of the energy in the fuel becomes heat for the home and the other 10 percent is wasted.

A **Solar Heat Gain Coefficient** (SHGC) usually refers to the solar energy transmittance of an entire window or sliding glass door.

The **U-Value** is the overall heat transfer coefficient that describes how well a building element conducts heat.



## DIVE DEEP FOR WATER SAVINGS



In previous sections of this book, we showed you how you can do your part to stave off the impact of drought with easy to intermediate water conservation measures. Here, we'll present more advanced ways to not only conserve water but to minimize the amount of energy that you use to heat the water in your home and maintain your pool.



**Vetting Your Contractors** – It can be difficult to find contractors who have experience installing specialized systems like heat-pump water heaters, whole-house ventilation systems or solar-powered water heaters. When selecting a contractor, be sure to ask if their technicians have been factory trained and how many times they've installed the unit(s) you're planning to purchase.



**Safety Note** – If your home contains appliances fueled by wood, gas, propane or oil, be sure to install a carbon monoxide detector. You should install at least one detector for every thousand feet of living space in your home.

### **Hot Water for Less**

If you're considering a new water heater, you can significantly reduce the amount of energy that you use for water heating by securing a permit from the City of Garland and working with a contractor to install one of the energy-efficient systems listed in the table on page 41.



## Overview: Energy-Efficient Water Heaters

Heater Type	Benefits	Other Considerations
<b>Heat-Pump Water Heater (HPWH)</b>	<ul style="list-style-type: none"> <li>HPWHs can reduce your water heating bill by up to 50 percent. These heaters don't actually create heat; they just move it from warmer environments to cooler ones by compressing refrigerant to a point where it can absorb or release heat to the exterior of your home.</li> <li>These units often come with the following energy-saving settings: <ul style="list-style-type: none"> <li>Efficiency/Economy</li> <li>Auto/Hybrid</li> <li>Electric/Heater</li> <li>Vacation/Timer</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>HPWHs need 700 - 1,000 cubic feet of space around them.</li> <li>They create a small amount of condensate that will need to be plumbed out of the house or disposed of using a floor drain.</li> <li>HPWHs are taller and heavier than standard water heaters - some weigh up to 410 lbs!</li> <li>These units aren't loud, but they do create a bit of noise. They also run year-round, including those few chilly months when the outdoor temperature is below 68 degrees Fahrenheit, so you should consider installing them in an area that's ventilated to the exterior of your home, like a garage or mechanical closet.</li> </ul>
<b>Tankless Gas Water Heater (TGWH)</b>	<ul style="list-style-type: none"> <li>These do not have bulky storage tanks, which means they take up less room and enable safer combustion.</li> <li>TGWHs are 10 - 15 percent more efficient than standard models.</li> <li>A well-maintained TGWH should have a useful life of almost twice that of a unit that's equipped with a standard storage tank.</li> <li>They provide an endless supply of hot water.</li> </ul>	<ul style="list-style-type: none"> <li>When these units do burn gas, they burn a lot more than a standard tank would, so you may need to install a larger gas line.</li> <li>In hard-water areas like Garland, TGWHs need to be accompanied by a water softening system. But, even with a softener, hard water may result in increased maintenance costs.</li> <li>An endless supply of hot water may cause you to take longer showers or waste hot water in other ways that will negate the energy cost savings.</li> </ul>
<b>Tankless Electric Water Heater</b>	<ul style="list-style-type: none"> <li>These devices are most appropriate for point-of-use scenarios. For example, if you have a large house and it takes forever for the back bathroom to get hot water, one solution might be to install an electric tankless water heater near the bathroom</li> </ul>	<ul style="list-style-type: none"> <li>Requires installation by an expert plumber.</li> <li>Uses electric resistance heat, which is not any more efficient than a standard electric storage tank.</li> </ul>
<b>Solar Water Heating</b>	<ul style="list-style-type: none"> <li>You can save up to 50 percent on water heating by installing one of the following solar systems: <ul style="list-style-type: none"> <li>Active Solar, Direct Circulation</li> <li>Active Solar, Indirect Circulation</li> <li>Passive Solar, Integrated Tank Collector</li> <li>Passive Solar, Thermosyphon System</li> </ul> </li> <li>For more information about solar hot water, check out: <a href="https://energy.gov/energysaver/articles/solar-water-heaters">energy.gov/energysaver/articles/solar-water-heaters</a></li> </ul>	<ul style="list-style-type: none"> <li>All solar systems will require maintenance that should be performed by a contractor about every four years.</li> <li>Before deciding on one of these systems, work with a contractor to: <ul style="list-style-type: none"> <li>Estimate the cost and efficiency of the systems you're considering.</li> <li>Evaluate your home's solar access.</li> <li>Determine the system size that's appropriate for your home.</li> <li>Check with the City of Garland and your neighborhood homeowner's association for codes and regulations.</li> </ul> </li> </ul>

## Hot Water Conservation Technologies

Technology	Benefits	Other Considerations
<b>On-Demand Water Circulation Pumps</b>	<ul style="list-style-type: none"> <li>• These units will transport hot water to certain areas of your home faster, which could save up to 10,000 gallons of water annually in households that have at least one faucet that takes 2 – 4 minutes to deliver hot water.</li> <li>• These are a relatively low-cost alternative to having your home re-plumbed.</li> </ul>	<ul style="list-style-type: none"> <li>• There are three types of on-demand water circulation pumps: <ul style="list-style-type: none"> <li>• Timer-controlled recirculation pumps</li> <li>• Continuous recirculation pumps</li> <li>• Demand-controlled recirculation pumps</li> </ul> </li> <li>• We recommend demand-controlled recirculation pumps because they offer the best combination of energy efficiency and fast access to hot water. However, you should contact a licensed plumber to determine which system is right for your home.</li> </ul>
<b>Drain Water Recovery Systems</b>	<ul style="list-style-type: none"> <li>• Every time you take a shower, do the dishes or wash a load of laundry, 75 percent of the heat that went into the water goes out of the house through the drain. Drain water recovery systems recuperate a portion of that heat through a heat exchanger.</li> </ul>	<ul style="list-style-type: none"> <li>• These are typically installed in hard-to-reach places below the main shower and/or drains in a home.</li> <li>• If installed in a household that's home to a family of four, these systems typically pay for themselves.</li> </ul>

### **Keep the Heat**

Whether you install a new water heater or continue to use your existing unit, you can save water and reduce your energy bill by paying attention to how much hot water you're using. But doing so doesn't have to mean taking cold showers or washing your dishes every other day. See the table above to learn about two technologies that can help you conserve hot water.

### **Catch Every Last Drop**

Rainwater harvesting systems are gaining in popularity throughout Texas. These systems allow you to water your lawn with rainwater that's been captured via barrels or catchment systems that are attached to your gutters or downspouts.

Some harvesting systems include pumps or filters and can allow you to switch between municipal water and rainwater when irrigating your lawn. If you're interested in rainwater harvesting, contact a licensed irrigator or irrigation technician and be sure to check neighbor association rules and city codes at [GarlandTx.gov](http://GarlandTx.gov).

### **Swimming in Savings**

If you have a swimming pool in your backyard, you can save 40 to 75 percent of the money you spend to run your pool pump by:

- Working with a contractor to replace your existing pool pump with a smaller ENERGY STAR unit.

- Only operating the pump for about six hours per day. If you notice the water does not appear clear when running the pump at this frequency, try increasing the time in half-hour increments until the water is clear.
- Cleaning your pool filter regularly.



## LAST-STEP LIGHTING IMPROVEMENTS



If you're reading this section, you've already replaced all your standard incandescent bulbs with CFLs or LEDs.

However, lighting improvements can also be more involved. In this section, we'll describe a few advanced lighting upgrades that require the help of a contractor but can have a big impact on the safety, comfort and efficiency of your home.

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### *The Fixture Swap*

If the recessed lighting fixtures in your home don't have an insulation contact (IC) rating, they can pose a fire hazard. If you live in a new home, you can determine whether the contractor installed IC-rated fixtures by looking for a label affixed to the inside of your recessed lights. If you can't find an IC-rating sticker, you should work with a local lighting contractor to replace your lights.

### *No Hands Clapping*

Lighting technology has advanced a long way since The Clapper® – a device that allows you to turn lights on and off with a clap of your hands. Today's lighting controls include:

**Dimmers** – These devices provide variable indoor lighting, save energy by reducing bulb wattage and output, and increase the service life of the bulbs throughout your home.

**Motion Controls** – By incorporating motion sensors, these controls automatically turn outdoor lights on when they detect motion and turn them off a short while later. They're very useful for outdoor security and utility lighting.

**Occupancy Sensors** – Occupancy sensors detect indoor activity within a certain area so that they can automatically turn lights on when someone enters a room and save energy by turning lights off soon after the last occupant has left.

**Photosensors** — Use these to prevent outdoor lights from operating during daylight hours.

**Timers** — Timer controls turn lights on and off at specific times, depending on the settings you select. There are two types of timers: manual timers, which plug into an electrical outlet for controlling objects such as lamps or light strings, and in-wall programmable digital timers, which look like digital thermostats and automate indoor or outdoor lighting.

For more information about which technology is right for you, contact your local lighting contractor.

#### **LEDs on the Pond**

If you run pool or pond lighting most nights of the year, upgrading to LEDs can definitely lead to savings. As described on page 9, LEDs save energy and have very long lives. The downsides are that they may not be available in the exact same color choices that you're used to for decorative water lighting and they can be a bit expensive. However, if you want to reduce energy waste and have pool and pond lamps that you won't have to change for many years, then your best choice is to work with a contractor to install LEDs.

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*This section includes data from the following organizations:*

- U.S. Department of Energy
- CLEAResult
- U.S. Environmental Protection Agency
- National Renewables Lab



## Notes From Your Neighbors

“ We installed an energy-efficient HVAC unit with the help of Garland Power & Light’s EnergySaver program and I’d recommend that any Garland resident participate in the program, especially considering the rebate we received. And I would say that if you’re looking to replace your air conditioner or furnace, you should go with an energy-efficient model because it saves energy and reduces costs for heating and cooling.”

— Eldon Epperson, Garland Resident

“ I worked with Garland Power & Light and a contractor to add insulation to my attic and to winterize my windows and doors. I definitely think these upgrades were worth it, and I recommend that any Garland resident consider making energy-efficient home improvements to get the biggest bang for their buck!”

— Suzanne, Garland Resident

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# ACTIVITIES

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These bite-sized activities are for you if you're not sure how to start improving the efficiency of your home, if you want an easy way to teach your family about saving energy and water or if you're struggling to fit efficiency improvements into your busy schedule.



# DEFLECTION DETECTION

## THE CHALLENGE

Redirect heated or conditioned air to make the rooms in your home more comfortable without using additional energy.

---

## WHAT YOU'LL NEED

- Step stool
- Notebook
- Hygrometer, room thermometer or light-switch thermometer (these are inexpensive and easy to find in the garden section of your local hardware store)
- Magnetic vent deflector(s) (also available at your local hardware store)

## INSTRUCTIONS

**1. Select a room** – Before you begin the assessment, identify a room in your home that's regularly occupied and that feels unusually warm in the summer or cool in the winter.

**2. Measure the temperature** – Place the hygrometer, room thermometer or light-switch thermometer in the center of the room.

**3. Take an initial reading** – After five minutes, record the room temperature in your notebook.

**4. Deflect** – Find the vents in the room, and using your vent deflector(s), adjust them so that they distribute air directly toward the center of the room. If the room contains a vent that's behind a piece of furniture or is not blowing air directly into the living area, use a deflector to aim the vent so that it distributes air into the room as directly as possible.

**5. Take a secondary reading** – After you've installed your deflector(s), wait five minutes and then record the new room temperature in your notebook.

**6. Think outside the room** – Is there a laundry room, utility room or other area of your home that's not frequently occupied and that contains a vent? If so, close the vent in that room to help divert heated or conditioned air into areas of your home that

are more frequently occupied. Then return to the room where you just installed the vent deflectors.

**7. Take a final reading** – After five more minutes, record the room temperature in your notebook one last time.

**8. Detect** – Take a look at the temperatures in your notebook. If you completed this activity during the summer, they should have decreased as you progressed through the steps of the activity; if you completed the activity in the winter, the temperatures should have increased.

**9. Repeat** – Completing this activity for just one room in your home will have a big impact on comfort, but for maximum effect, you can repeat this activity in your kitchen, bedrooms, study and any other frequently-occupied spaces in your home.

# WATER LEAK HIDE-AND-SEEK

## THE CHALLENGE

Identify water leaks and inefficient water usage in your home.

---

## WHAT YOU'LL NEED

- Blue or red food coloring
- Water alarm(s) (these inexpensive devices function like smoke detectors and are available at your local hardware store)
- Half-gallon milk container
- Scissors
- Stopwatch or clock

## INSTRUCTIONS

**1. Look for toilet leaks** – Place five drops of food coloring into your toilet tank. Without flushing, do you see any blue or red showing up in the bowl? If so, you have a leak that a local contractor can help you repair.

**2. Set an alarm** – Water alarms are so easy to install that even kids can do it. Just place standard water alarms or family-friendly alarms like the LeakFrog\*

behind washing machines, under refrigerators, behind water heaters or under sinks. Should a leak occur, they'll emit an audible alert.

**3. Determine the efficiency of your faucets or showerheads** – This quick test will help you determine the efficiency of your faucets or showerheads and is a great opportunity for the whole family to learn about water efficiency.

- **Step 1:** Cut the top off of a half-gallon milk container and get a stopwatch or clock ready.
- **Step 2:** Put the container under your faucet.
- **Step 3:** Turn the cold water on full blast and see how long it takes to fill the container. If you can fill it in 15 seconds or less, then you have an excellent opportunity to save water by installing an efficient showerhead or aerator. To start saving immediately, use the now full container to water your indoor plants!

\*[leakfrog.com/leakfrog.html](http://leakfrog.com/leakfrog.html)

# LIGHT BULB BLITZ

## THE CHALLENGE

Determine how much energy you could save by improving the efficiency of the lights in your home.

---

## WHAT YOU'LL NEED

- Printed copy of the lighting inventory chart on page 49
- The square footage of your home
- Pencil
- Step stool

## INSTRUCTIONS

**1. Count your bulbs** – Record the number and type of bulbs in your home on the lighting inventory chart.

**2. Estimate wattage** – Determine the wattage of each bulb in your home, either by checking each light fixture and entering the actual wattage of your bulbs or by using the figures in the estimated-wattage column of the chart.

**3. Add 'em up** – Determine your total wattage by multiplying the quantity column by the wattage column (actual or estimated). Record the results in the “current” column of the “total wattage” row.








**4. Calculate your potential savings** – Pretend that you replaced all of your incandescent bulbs with CFLs or LEDs. Then adjust the quantity column of the chart accordingly, repeat step 3 and record your new results in the “projected” column of the “total wattage” row.

**5. Score your home** – Divide the square footage of flooring in your home by the wattage totals that you calculated during steps 3 and 4; record your results in the “watts per square foot of flooring” row. Then use the key at the bottom right corner of the lighting inventory chart to determine the current and projected efficiency of your home.

For specific tips about how you can improve lighting efficiency in your home, please see page 8 of the Efficiency Idea Book.

This activity was adapted from information provided by Northwest ENERGY STAR® Homes

Lighting Inventory Chart

Bulb Type	Image	Qty	Actual Wattage	Estimated Wattage	Total Wattage
Standard Incandescent				64	
CFL				14	
LED				7	
Reflector				75	
Halogen				40	
Candelabra				40	
MR16				40	
Home Square Footage:					
			Current:	Projected:	
Total Wattage					
Watts per Square Foot of Flooring					

If your watts per square foot of flooring are:	Your lighting efficiency rating is:
1.5 or more	Fair; there's room for improvement
1.0 – 1.5	Good
0.5 or less	Outstanding

# PLUG POWER

## THE CHALLENGE

Determine how much electricity you can save by optimizing your plug-in devices and appliances.

---

## WHAT YOU'LL NEED

- Power meter, such as the Kill-A-Watt™ or the Watts Up? Pro Power Meter
- Printed copy of the plug load assessment sheet on page 51
- Pencil

## INSTRUCTIONS

**1. Make a game plan** – Determine which plug-in devices you want to evaluate and record them on the plug load assessment sheet. It's best to pick devices that you use frequently or that are plugged in continuously.

**2. Get familiar with your power meter** – Take a few minutes to learn how to use your power meter to determine the electricity draw of each device on your list. Most power meters come with instruction manuals or online documentation that can help.

**3. Assess your devices** – Using your power meter, determine how many watts of electricity each device uses while switched on and while switched off. Use the plug load assessment sheet to record the results.

**4. Start chipping away** – After you've recorded your original wattage, read through the Energy Efficient Appliances section on page 16. Select one or two ways that you can make a device on your list more energy efficient and implement the changes.

**5. Measure your savings** – Once you've adjusted your device(s), repeat step three and record the results in the "revised power draw" column of the plug load assessment sheet. How much energy did you save? How much could you save if you optimized each device on your list?



## PLUG LOAD ASSESSMENT SHEET

**Use this sheet to record how much power your plug-in devices draw. Commonly assessed devices include: televisions, home audio equipment, laptop or desktop computers, device chargers and kitchen appliances.**

[illegible]

# INDEX

## A

A/C: tune-up, 36; window units, 26, 27  
Activities, 45; air deflection, 46; bulb replacement, 48; family-friendly, 24, 45; plug load assessment, 50; water leak detection, 47  
AFUE. See Annual Fuel Utilization Efficiency  
Air: deflection, 46; filters, 14; leaks, 12, 13; quality, 38; sealing, 12  
Annual Fuel Utilization Efficiency, 39  
Appliances: energy-saving tips, 16, 50; location of, 17; purchasing, 18; temperature settings, 17  
Audit: free energy audit, 38

## B

Backer Rods, 12  
Batt. See Batting  
Batting, 39

## C

Calculator: lighting, 8  
Carbon monoxide detectors, 40  
CFLs, 8, 9 switching to, 8, 9, 48  
Chimney: balloon, 14; sealing, 35  
Clothes Dryers: optimizing, 17; purchasing, 20  
Clothes Washers: optimizing, 17; purchasing, 19  
Community Programs, 21  
Compact Fluorescent Lights. See CFLs  
Conservation: credit, 19; energy, 15, 19, 42; family-friendly, 24; programs, 21; water, 11, 22, 42  
Contractors: selecting, 40

## D

Dimmers. See Lighting

Dishes: hand washing, 17; scraping, 18  
Dishwashers: optimizing, 17, 18; purchasing, 18  
Door Guards, 13  
Door Seals, 16  
Drought, 22, 24  
Duct: condensation, 33; insulation, 33; leakage, 32; sealing, 33

## E

Electronics, 16, 19; optimizing, 16, 50  
EnergySaver Program, 26, 32, 37, 44  
Evapotranspiration. See Water

## F

Fans, 15; exhaust, 27  
Faucets, 10, 47; free aerators, 10  
Foam: gaskets, 13; low-expanding, 13  
Free Energy-Efficient Products, 10, 21  
Free Services: energy audit, 38; healthy living expo, 21  
Freezers: defrosting, 17; purchasing, 18

## G

Games: family-friendly, 24

## H

Halogen Bulbs, 9  
Halogen Torchiere Lamps, 9  
Healthy Living Expo, 21  
Heating Seasonal Performance Factor, 39  
Heating System: efficiency, 37; electric, 38; gas or propane, 38; heat pump, 38; replacement, 37; tune-up, 36  
Hot Water Conservation, 42  
HSPF. See Heating Seasonal Performance Factor

## I

IC Rating. See Insulation Contact Rating  
Incandescent Bulb, 8; phase out, 9  
Insulation, 33, 34  
Insulation Contact Rating, 43

## K

Kelvin, 9  
Kitchen: ventilation, 27

## L

Landscaping, 15, 28, 31  
Lawn Mowing, 22  
LEDs, 9; for pools, 44; switching to, 48  
Light Emitting Diode Bulbs. See LEDs  
Lighting: bulb replacement, 48; cost of, 8, 9; dimmers, 43; motion controls, 43; occupancy sensors, 43; photosensors, 44; recessed, 27, 43; solar-powered, 30; technology, 43; timers, 43  
Lumen, 9  
Luminous Efficacy, 9

## M

Microwaves, 19

## P

Photosensors. See Lighting  
Plants: native, 22  
Plug Load Assessment Sheet, 51  
Plugs, 14  
Pool, 42  
Power: meter, 16; strips, 16; supplies, 19, 20

## R

Rain Barrels, 42

Rainwater Harvesting, 42  
Rebates, 9, 20; EnergySaver Program, 26, 32, 37, 44  
Refrigerators: optimizing, 17; purchasing, 18  
R-value, 39

## S

Safety Note, 11, 40  
Seasonal Energy Efficiency Ratio, 39  
SEER. See Seasonal Energy Efficiency Ratio  
SHGC. See Solar Heat Gain Coefficient  
Showerheads, 10, 47; free, 10  
Solar: lighting, 30  
Solar Heat Gain Coefficient, 39  
Solar Screens, 15  
Sprinklers, 22  
Stoves: purchasing, 20  
Strip Heat Lockouts, 25

## T

Temperature Settings: appliances, 17; home, 15  
Testimonials, 21, 44  
Thermostats: programmable, 25  
Toilets, 17, 24; purchasing, 20

## U

U-Value, 39

## V

Ventilation: kitchen, 27  
Vents, 16, 46

## W

Water: alarm, 47; circulation pump, 42; conserving hot water, 42; drain water recovery, 42; evapotranspiration, 22; heating, 40; leaks, 47; optimum temperature, 11;



restrictions, 22  
Water Heater: insulation, 11; thermostats, 11  
Watt, 9  
Weather Stripping, 13  
Window: A/C. See A/C; film, 15; optimization, 35; replacement, 36  
X  
Xeriscaping, 22



